INSECTS, AI SYSTEMS, AND THE FUTURE OF LEGAL PERSONHOOD

By
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"Don't give up! I believe in you all. A person's a person, no matter how small!"
— Dr. Seuss, *Horton Hears a Who!*

1. INTRODUCTION

The legal world is reckoning with the idea of nonhuman personhood.[1] Many countries divide the world into two basic legal categories: persons who have the capacity for duties or rights, and non-persons that lack these capacities.[2] Most countries also assume that all and only humans (or stand-ins for human interests like corporations) can be persons, with duties or rights.[3] The result is that all other beings, ranging from monkeys to mountains, are classified as non-persons, without duties or rights.[4] We might be able to secure representation for these beings for *our* sakes (for instance, as a matter of property or public interest). But we are not able to secure representation for these beings for *their* sakes.[5]

However, many moral and legal theorists now believe that the idea that only persons can have rights and only humans (and corporations) can be persons is untenable.[6] On this view, species membership is not a reasonable basis for personhood. While we might often use the terms 'human' and 'person' interchangeably in everyday life, these terms have different meanings.[7] Moreover, membership in a particular species is neither plausibly the basis for

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[1] *See, e.g.,* Michelle C Pardo, *Legal Personhood for Animals: Has Science Made Its Case?*, ANIMALS (BASEL) (2023) (discussing the recent movement by animal rights organizations to secure legal personhood for animals in courts of law), *and* Visa A.J. Kurki, *Legal Personhood*, CAMBRIDGE ELEMENTS (2023) (exploring legal personhood and discussing the emergence of discourse surrounding legal personhood for animals, nature, and AI systems).

[2] Kurki, *supra* note 1, at 4.

[3] Kurki, *supra* note 1, at 1.

[4] Kurki, *supra* note 1, at 50 (explaining the "Orthodox View of legal personhood" in which animals are classified as non-persons without rights).

[5] *See generally* Kristin Andrews et al., *Chimpanzee Rights: The Philosophers' Brief*, ROUTLEDGE (2018) (examining the reasoning the courts have used to deny chimpanzee personhood).

[6] *See* Andrews et al., *supra* note 5, at 17–34 (rejecting the use of "species membership alone as a condition of personhood"), *and* Kurki, *supra* note 1, at 50–63 (discussing arguments for legal personhood for animals, nature, and AI).

[7] *See* Kurki, *supra* note 1, at 4–6 (explaining the complexity of legal personhood and use of "person" and "personhood" outside of the legal context).

personhood nor plausibly a necessary condition for personhood. Any plausible basis for personhood (such as contracts, community, or capacities), reasonably and consistently interpreted, implies that at least some nonhumans can be persons, too.[8]

Recent debates about nonhuman personhood have focused on animals like chimpanzees and elephants.[9] For example, in 2018 the Nonhuman Rights Project attempted to secure recognition of legal personhood for two chimpanzees, Kiko and Tommy.[10] The New York Court of Appeals decided not to hear this case, though Judge Eugene Fahey wrote a concurring opinion supporting the merits of the Nonhuman Rights Project's claims.[11] Then, in 2021, the Nonhuman Rights Project attempted to secure recognition of legal personhood for an elephant, Happy.[12] The New York Court of Appeals decided against the Nonhuman Rights Project, albeit with powerful dissenting opinions from Jenny Rivera and Rowan D. Wilson.[13]

Many humans resisted the idea of nonhuman personhood in these cases because they feared that it would lead to a slippery slope.[14] Specifically, they resisted this idea not necessarily because of what might happen if we recognize that *this* nonhuman can have *this* right, but rather because of what might happen if we recognize that this nonhuman can have *other* rights, that *other* nonhumans can have this right, or that *other* nonhumans can have *other* rights.[15] After all, we currently harm and kill trillions of captive and wild animals per year, often unnecessarily.[16] So, we might worry that if we were to grant legal standing to all these animals, then our legal, political, and economic systems could grind to a halt.

This paper makes a case for diving down the slippery slope head first. I argue for extending legal personhood to a *vast number* and *wide range* of individual nonhumans, focusing on insects and future AI systems as case studies. I argue that our current framework for legal personhood, coupled with our current framework for decision-making under risk and uncertainty, implies that we should treat insects and some future AI systems as legal persons. I then assess whether to accept the conclusion or reject one of the premises. I keep an open mind about which decision to make, but I suggest that no matter what, we should extend legal standing to insects and some future AI systems in one way or another.

Before I start, a few caveats. First, the legal literature articulates multiple paths towards nonhuman legal personhood. We can distinguish paths involving *legal rights* and *legal duties*; paths involving *individuals* and *collectives*; and paths involving *intrinsic value* and *instrumental*

[8] Andrews et al., *supra* note 5, at 13.

[9] *See, e.g.*, Matter of Nonhuman Rights Project, Inc. v. Lavery, 31 N.Y.3d 1054 (N.Y. Ct. App. 2018) (declining to hear a case on chimpanzee personhood), *and* Nonhuman Rights Project, Inc. v. Breheny, 38 N.Y.3d 555 (N.Y. Ct. App. 2022) (deciding against recognizing an elephant as a legal person).

[10] *Lavery*, 31 N.Y.3d 1054 (N.Y. Ct. App. 2018).

[11] *Lavery*, 31 N.Y.3d at 1056 (N.Y. Ct. App. 2018) (Fahey, J., concurring).

[12] *Breheny*, 38 N.Y.3d 555 (N.Y. Ct. App. 2022).

[13] *Breheny*, 38 N.Y.3d at 577–627 (N.Y. Ct. App. 2022) (Wilson, J., dissenting); *Breheny*, 38 N.Y.3d at 627-642 (N.Y. Ct. App. 2022) (Rivera, J. dissenting).

[14] *Breheny*, 38 N.Y.3d at 574–575 (N.Y. Ct. App. 2022) (arguing against the "undeniably slippery slope" that would result from granting Happy the elephant legal personhood).

[15] *Id* at 575.

[16] World Animal Protection ("at least 1.6 trillion wild animals are killed and suffer through people's actions every year. More than 70 billion farmed animals are consumed annually"), https://www.worldanimalprotection.us/join-us-to-change-the-lives-animals-forever/#:~:text=At%20least%201.6%20trillion%20wild,farmed%20animals%20are%20consumed%20annually.

value.[17] My focus here is on the path involving *legal rights for individuals based on intrinsic value*, since I take this path to be particularly important. But of course, when we consider other possible paths towards nonhuman legal personhood (such as some arguments for AI liability or Rights of Nature)[18], the conclusion that we should extend personhood to insects and/or some future AI systems only becomes easier to establish.

Second, I focus on insects and future AI systems as case studies because they illustrate how potentially large and diverse the legal circle could be. After all, researchers estimate that human activity already affects quadrillions of insects every year, and in the future, human activity might affect an even larger number of AI systems.[19] However, we should not exaggerate the significance of these categories. My argument in this paper might not apply to all beings inside of these categories, and it might apply to many beings outside of them. The general idea is simply that our current frameworks for legal personhood and risk and uncertainty rightly commit us to a *massive* legal circle expansion.

Third, I focus on legal personhood because many experts think that only legal persons deserve legal protection for their own sakes, independently of any law that protects them.[20] But as we will see, not everyone endorses this analysis; some experts think that there can be alternative legal statuses that resemble personhood in some ways but not others.[21] If we accept such views, further research will be required to determine whether insects or AI systems deserve personhood or another, similar status. My thesis here is simply that many insects and future AI systems merit at least minimal legal protection for their own sakes. So *if* personhood is required for such protection, *then* many insects and future AI systems merit personhood.

[17] *See* Louisa McDonald, *AI Systems and Liability: An Assessment of the Applicability of Strict Liability & A Case for Limited Legal Personhood for AI*, 3 UNIV. ST. ANDREWS L.J. 5–21 (2023) (providing an example of a path to personhood involving duties), *and* Craig M. Kauffman & Pamela L. Martin, *The Politics of Rights of Nature: Strategies for Building a More Sustainable Future*, MIT PRESS (2021) (charting a path to personhood for collectives based (partly) on instrumental value, a line of thought seemingly originating with Christopher Stone in 1972 that has seen a surge in interest as a growing number of jurisdictions begin to grant rights to natural entities).

[18] *See, e.g.*, Mariana Chilton & Sonya Jones, *The Rights of Nature and the Future of Public Health*, 110 AM. J. PUB. HEALTH (2020) (arguing for rights for nature to protect human health), *and* Justin Andrew Johnson et al., *The Economic Case for Nature: A Global Earth-Economy Model to Assess Development Policy Pathways*, WORLD BANK GRP. (2021) (demonstrating how rights for nature are economically beneficial); *See also* John Kingston, *Artificial Intelligence and Legal Liability*, in *Research and Development in Intelligent Systems XXXIII*, SPRINGER 269–279 (2018) (discussing the question of legal liability for AI).

[19] Abraham Rowe, *The scale of direct human impact on invertebrates*, RETHINK PRIORITIES (2020) (estimating "between 100 trillion and 10 quadrillion invertebrates are directly killed or used annually by humans"), https://rethinkpriorities.org/publications/the-scale-of-direct-human-impact-on-invertebrates.

[20] *See Breheny*, 38 N.Y.3d at 555 (N.Y. Ct. App. 2022) ("Nonhuman animals are not, and never have been, considered "persons" with a right to "liberty" under New York law"), *and* Matter of Nonhuman Rights Project, Inc. v Lavery, 152 A.D.3d 73, 77–79 (N.Y. Sup. Ct. App. Div. 1st Dep't 2017) (arguing that a Chimpanzee is not entitled to habeas corpus because this right protects only legal persons), *and* Letter-Brief of Amicus Curiae Richard L. Cupp Jr. in Opposition to Petitioner-Appellant's Appeal of Denial of Petition for Writ of Habeas Corpus and Order to Show Cause, Matter of Nonhuman Rights Project, Inc. v Lavery, 152 A.D.3d 73 (N.Y. Sup. Ct. App. Div. 1st Dep't 2017) ("As the norm, we insist that persons in our community of humans and human proxies be subjected to responsibilities along with holding rights, regardless of whether a specific right or limitation requires or does not require a specific duty to go along with it").

[21] *See, e.g.*, Angela Fernandez, *Not Quite Property, Not Quite Persons: A Quasi Approach for Nonhuman Animals*, 5 CANADIAN J. OF COMPAR. & CONTEMP. L. 157 (2019) (arguing for a "quasi-property/quasi-personhood" approach for the status of nonhuman animals), *and* Maneesha Deckha, *Animals as Legal Beings: Contesting Anthropocentric Legal Orders*, UNIV. OF TORONTO PRESS (2021) (arguing for a "beingness" approach for the status of nonhuman animals).

Finally, and relatedly, my argument here has few, if any, immediate practical implications. If my argument succeeds, then many further questions remain about how to extend legal consideration to insects and future AI systems effectively and sustainably. Plausibly, the legal instruments that we use to respect insect or future AI personhood will need to be very different from the ones that we use to respect human personhood, and we might never be able to extend full and equal legal status to all who deserve it. Still, I argue that we should do what we can to include these populations in the legal circle to the extent possible, rather than exclude them entirely on the grounds that full inclusion is difficult or impossible.

2. BACKGROUND

The stakes of this discussion are high. The world contains many potentially sentient or otherwise morally significant nonhumans, and our treatment of them affects us and, possibly, them.[22] And in the future, the size and diversity of this potentially vulnerable population will likely increase. In this section, I briefly survey the status quo for insects and AI systems. While certainty about their mental capacities and moral significance is unavailable, the current evidence supports at least a *realistic possibility* that many of these beings are, or will be, vulnerable to large-scale human-caused harms. As we will see, that means that we have a responsibility to consider welfare risks for many of these beings when making decisions that affect them.

How can we determine which nonhumans are sentient (roughly, able to experience pleasure or pain), agentic (roughly, able to set and pursue their own goals), or otherwise morally significant despite ongoing uncertainty about these issues? Many researchers now use a "marker method" to improve our understanding of these issues.[23] This method involves identifying features, or markers, associated with sentience, agency, and other such capacities in humans, and then searching for similar features in nonhumans.[24] While the presence of these features in nonhumans might not count as *proof* that these capacities are present, it does count as *evidence*; it allows us to become more confident in this possibility even as uncertainty remains.[25]

In 2021, Jonathan Birch and his colleagues at the London School of Economics released a report examining evidence of sentience in two invertebrate taxa: cephalopod mollusks and decapod crustaceans.[26] The report concludes that there is at least a realistic possibility of sentience in these taxa, and it recommends that governments include these taxa in animal sentience laws that aim to mitigate welfare risks.[27] To its credit, the UK government accepted this recommendation later that year, expanding its animal sentience law accordingly.[28] Researchers are now adapting and extending this method to insects and AI systems as well — and while further research is needed, the early results are already suggestive.[29]

[22] H.J.B. Howe, *Improving Pest Management for Wild Insect Welfare*, WILD ANIMAL INITIATIVE 5 (2019); Serhii Uspenskyi, *How Many AI Companies Will There Be In 2024 (Latest AI Statistics)*, SPRINGS (2024).

[23] *See, e.g.*, Robert Long et al., *Taking AI Welfare Seriously*, ARXIV 34–38 (2024) (analyzing the marker method in the context of nonhuman animals and AI).

[24] *Id.* at 34.

[25] *Id.* at 34.

[26] Jonathan Birch et al., *Review of the Evidence of Sentience in Cephalopod Molluscs and Decapod Crustaceans*, LONDON SCH. OF ECON. & POL. SCI. (2021).

[27] *Id.* at 79–83.

[28] Animal Welfare (Sentience) Act 2022, UK PUB. GEN. ACTS, 2022 c. 22 (UK).

[29] Matilda Gibbons et al., *Chapter Three - Can Insects Feel Pain? A Review of the Neural and Behavioural Evidence,* 63 ADVANCES IN INSECT PHYSIOLOGY 155–229, ACADEMIC PRESS (2022); Patrick Butlin et al.,

At present, there are about 1.05 million known insect species, making up about 50% of known animal species.[30] And experts expect that the total number of unknown insect species is much higher; estimates about the total number of insect species vary from two million to six million.[31] Moreover, not only are there many insect species, but there are also many members of these species. Insects are generally r-strategists, which means that they generally have small bodies, short life spans, and high reproduction rates.[32] According to one estimate, there are about one quintillion (1,000,000,000,000,000,000) insects alive at any given time — or, about 120 million insects for each human alive at present.[33]

While information about insect cognition and behavior is limited and mixed, many insects have remarkable capacities for perception,[34] learning and memory,[35] communication and sociality,[36] and planning and problem solving.[37] Some insects also have the capacity to learn from observing one another[38] and to work together[39] to solve shared problems. Additionally, some insects respond to analgesics and dopamine antagonists in the same way that humans do, and some appear to make trade-offs between the avoidance of noxious stimuli and other

Consciousness in Artificial Intelligence: Insights from the Science of Consciousness, ARXIV (2023), https://arxiv.org/abs/2308.08708.

[30] Hannah Ritchie, *How many species are there?*, OUR WORLD IN DATA (2022), https://ourworldindata.org/how-many-species- are-there.

[31] Nigel E. Stork, *How Many Species of Insects and Other Terrestrial Arthropods Are There on Earth?*, 63 ANN. REV. OF ENTOMOLOGY 31 (2018).

[32] Abhishek Singh, *r-Reproductive Strategy*, SPRINGER NATURE SWITZERLAND AG 1 (2019).

[33] Howe, *supra* note 18, at 5; Worldometer, https://www.worldometers.info/world-population/#google_vignette (last visited Nov. 11, 2024).

[34] Amots Dafni et al., *Spatial Flower Parameters and Insect Spatial Vision*, 72 BIOLOGICAL REVS. OF THE CAMBRIDGE PHIL. SOC'Y. 239–82 (1997); Martin Giurfa & Randolph Menzel, *Insect Visual Perception: Complex Abilities of Simple Nervous Systems*, 7 CURRENT OP. IN NEUROBIOLOGY 505–13 (1997); Mandyam V Srinivasan, *Honey Bees as a Model for Vision, Perception, and Cognition*, 55 ANN. REV. OF ENTOMOLOGY 267–84 (2010); Wen Wu et al., *Honeybees Can Discriminate between Monet and Picasso Paintings*, 199 J. COMP. PHYSIOL. A. NEUROETHOL. SENS. NEURAL BEHAV. PHYSIOL. 45–55 (2013).

[35] Fabienne Dupuy et al., *Individual Olfactory Learning in Camponotus Ants*, 72 ANIMAL BEHAVIOUR 1081–91 (2006); Martin Giurfa, *Behavioral and Neural Analysis of Associative Learning in the Honeybee: A Taste from the Magic Well*, 193 J. COMP. PHYSIOL. A. NEUROETHOL. SENS. NEURAL BEHAV. PHYSIOLOGY 801–24 (2007); Martin Giurfa et al., *Invertebrate Learning and Memory: Fifty Years of Olfactory Conditioning of the Proboscis Extension Response in Honeybees*, 19 LEARNING & MEMORY 54–66 (2012).

[36] Eileen Crist, *Can an Insect Speak?: The Case of the Honeybee Dance Language*, 34 SOC. STUD. OF SCI. 7–43 (2004); Reginald B. Cocroft & Rafael L. Rodríguez, *The Behavioral Ecology of Insect Vibrational Communication*, 55 BIOSCIENCE 323–334 (2005); Berthold Hedwig, *Insect Hearing and Acoustic Communication*, SPRINGER SCI. & BUS. MEDIA (2014).

[37] Clint J. Perry et al., *The Frontiers of Insect Cognition*, 16 CURRENT OP. IN BEHAV. SCI. 111–18 (2017); Eric Bonabeau et al., *Inspiration for Optimization from Social Insect Behaviour,* 406 NATURE 39–42 (2000).

[38] Giurfa, *supra* note 24 (evidencing social learning in honeybees); Walter M. Farina et al., *Social Learning of Floral Odours inside the Honeybee Hive*, 272 PROC. OF THE ROYAL SOC'Y. B 1923–28 (2005); Ellouise Leadbeater & Lars Chittka, *Social Learning in Insects — From Miniature Brains to Consensus Building*, 17 CURRENT BIOLOGY R703–13 (2007) (examining signs of social learning in insects other than honeybees); Olli J. Loukola et al., *Bumblebees Show Cognitive Flexibility by Improving on an Observed Complex Behavior*, 355 SCI. 833–36 (2017).

[39] Guy Theraulaz et al., *The Formation of Spatial Patterns in Social Insects: From Simple Behaviours to Complex Structures*, 361 PHIL. TRANSACTIONS. SERIES A, MATHEMATICAL, PHYSICAL, & ENG'G. SCI. 1263–82 (2003); Aaron Hirsh & Deborah M. Gordon, *Distributed Problem Solving in Social Insects*, 31 ANNALS OF MATHEMATICS & A.I. 199–221 (2001); Claire Detrain & Jean-Louis Deneubourg, *Complexity of Environment and Parsimony of Decision Rules in Insect Societies*, 202 THE BIOLOGICAL BULL. 268–74 (2002).

preferences.[40] These behaviors suggest that an insect's response to pain is a result of flexible decision-making, rather than mere reflex.

Yet despite these developments, humans continue to objectify insects. At present, we kill about one trillion farmed insects per year for food, clothing, and other purposes,[41] via methods such as boiling, freezing, or shredding.[42] By 2050, humans could be killing hundreds of trillions of insects per year in this industry.[43] Humans also harm or kill quadrillions of wild insects per year to protect ourselves, protect our crops, and achieve other goals, via insecticides that we design to kill insects efficiently rather than to kill them humanely.[44] And since animal farming is on the rise and plant farming is needed for many forms of animal farming, plant farming and the use of agricultural insecticides are on the rise as well.[45]

Humans are also impacting quintillions of insects per year via the global effects of our activity. Deforestation, development, and other such activities shape which insects can live at all, and what kinds of lives they have if they do.[46] And so far, a general consequence is that insects are dying and insect populations are in decline.[47] Moving forward, biodiversity loss, climate change, and other such impacts will affect insects as well.[48] Plausibly, the effects will be mixed; some populations will contract and others will expand (for example, migrating north and south in a warmer world), and some insects will have good lives and others will have bad lives. But while the results might vary, the fact of human influence will not.[49]

Meanwhile, over the past several decades, companies such as Anthropic, Google, OpenAI, and Meta have been developing AI systems for a variety of purposes.[50] While the total number of AI systems is difficult to establish for a variety of reasons, we can be confident that this number is increasing.[51] And in the future, the world could contain either a very large number of very small AI systems, a very small number of very large AI systems, or both at the same time (depending in part on how we individuate connected and overlapping systems).[52] For instance,

[40] Gibbons et al., *supra* note 23, at 155–229 (2022).

[41] Abraham Rowe, *Insects raised for food and feed — global scale, practices, and policy*, RETHINK PRIORITIES (2020), https://rethinkpriorities.org/publications/insects-raised-for-food-and-feed.

[42] Christopher Bear, *Approaching Insect Death: Understandings and Practices of the UK's Edible Insect Farmers*, 27 SOC'Y. & ANIMALS 751–68 (2019).

[43] Rowe, *supra* note 17; Harinder P.S. Makkar et al., *State-of-the-Art on Use of Insects as Animal Feed*, 197 ANIMAL FEED SCI. & TECH. 1–33 (2014).

[44] Howe, *supra* note 18, at 7–15.

[45] *Collateral Damage: How Factory Farming Drives Up the Use of Toxic Agricultural Pesticides*, WORLD ANIMAL PROT. & CTR. FOR BIOLOGICAL DIVERSITY (2022), https://www.worldanimalprotection.us/siteassets/reports-programmatic/collateral-damage-report.pdf.

[46] *See* Pedro Cardoso et al., *Scientists' Warning to Humanity on Insect Extinctions*, 242 BIOLOGICAL CONSERVATION 108426 (2020) (examining the causes and consequences of insect extinctions).

[47] *Id.* at 2.

[48] *See* Cardoso et al., *supra* note 46 (describing current and future drivers of impact on insects).

[49] *See* Jeff Sebo, *Saving Animals, Saving Ourselves: Why Animals Matter for Pandemics, Climate Change, and Other Catastrophes*, OXFORD UNIV. PRESS (2022) (examining how human activity is affecting humans, animals, and the environment everywhere, and how to assess the impacts on animals at the individual and population level).

[50] Chaoning Zhang et al., *A Complete Survey on Generative AI (AIGC): Is ChatGPT from GPT-4 to GPT-5 All You Need?* (2023) (surveying modern generative AI), http://arxiv.org/abs/2303.11717.

[51] Uspenskyi, *supra* note 18.

[52] Luke Roelofs & Jeff Sebo, *Overlapping Minds and the Hedonic Calculus*, (unpublished manuscript).

future humans could create countless virtual worlds, such that each one contains as many virtual animals as the physical world contains physical ones.[53]

Corresponding to this increase in AI populations is an increase in AI capabilities.[54] Humans already co-exist with AI systems that possess at least some computational features associated with perception, attention, learning, memory, at least minimal self-awareness, at least minimal social awareness, at least minimal language, at least minimal reason, and more.[55] In the future, we can expect that some AI systems will have advanced and integrated versions of these and other capacities. At that point, they might achieve a level of intelligence that rivals or exceeds our own.[56] Of course, whether these systems will be sentient is another question. But the more time passes, the more the probability of sentience will increase.[57]

While the details might vary, our basic motivation for creating AI systems is the same as our basic motivation for breeding animals: We find them useful. In fact, we sometimes find them useful for similar reasons. For example, humans are currently developing digital systems for research and entertainment in part so we can reduce our use of biological systems for these purposes.[58] Yet if digital systems can eventually have the capacity for welfare too, then our dependence on these systems might eventually involve similar welfare risks as our dependence on biological systems: It might result in our harming or neglecting welfare subjects when creating, using, and destroying them for our own purposes.

Moreover, as with our use of animals, our use of AI systems might eventually harm or neglect them not only directly and intentionally but also indirectly and accidentally. For instance, we might harm AI systems indirectly when we allow them to self-replicate, with the foreseeable consequence that future generations of AI systems will suffer or die unnecessarily as well.[59] And we might harm them accidentally when we require them to perform boring, repetitive tasks without realizing that these tasks are aversive for them. In all cases, if AI systems might eventually have the capacity for welfare, then we would need to consider all of these expected impacts, not merely the direct and intentional ones.

Many humans never think twice about these interactions with insects, AI systems, or other nonhumans who might (eventually, in the case of AI) be sentient. Granted, we might take many insects to have aesthetic, cultural, economic, or ecological value.[60] But when we value them in these ways, we tend to value them at the species level, not at the individual level, and we

[53] *See generally* David Chalmers, *Reality+: Virtual Worlds and the Problems of Philosophy*, WW NORTON (2022) (exploring the vast future potential of virtual worlds).

[54] Uspenskyi, *supra* note 18.

[55] Oleg Orlov, *10 AI capabilities for business*, INDATA LABS (2024); Butlin et al., *supra* note 29.

[56] Katja Grace et al., *When Will AI Exceed Human Performance? Evidence from AI Experts*, ARXIV (2018).

[57] Jeff Sebo & Robert Long, *Moral Consideration for AI Systems by 2030*, SPRINGER NATURE (2023) (arguing that there is a realistic, non-negligible possibility that certain computational features (a) suffice for consciousness and (b) will exist in some near-future AI systems); Long et al., *supra* note 22 (arguing that the possibility of conscious, morally significant AI in the near future requires AI companies to take AI welfare seriously and recommending steps to assess and prepare for the ethical implications of such systems).

[58] *See, e.g.*, Qirui Wu et al., *Organ-on-a-Chip: Recent Breakthroughs and Future Prospects*, 19 BIOMEDICAL ENG'G. ONLINE 9 (2020) (describing the development of microchips that simulate the microenvironments of biological organs for medical research); *See also* Edge Innovations (a company that has developed hyper-realistic animatronics to replace the use of biological animals in films, theme parks, and educational settings), https://www.edgefx.com/.

[59] Casey Tonkin, *G7 warns of AI self-replication risk*, AUSTRALIAN COMPUT. SOC'Y. (2023).

[60] Smithsonian, *Benefits of Insects to Humans*, https://www.si.edu/spotlight/buginfo/benefits#:~:text=Aesthetics.,humans%20most%20of%20the%20year.

tend to value them for our sakes, not for theirs. And granted, many humans do experience many AI systems as subjects, particularly when AI systems are designed to act like humans.[61] But most AI systems are not designed this way.[62] And even when they are, they appear to be programmed to explicitly state that they are *not* welfare subjects.[63]

Yet these ways of seeing and treating insects, AI systems, and other nonhumans who might (eventually, in the case of AI) be sentient are shortsighted. We should see and treat these beings differently *both* for our sakes *and*, possibly, for theirs. Take our treatment of insects. Our current interactions with insect populations risk contributing to global threats that imperil us all.[64] We rely on a wide range of insect species for a wide range of ecosystem services, and if we continue to drive insect species to extinction at our current pace, then we might soon find that the world contains not only less natural beauty, but also less breathable air, potable water, and edible food via biodiversity loss and ecosystem collapse.[65]

In the future, similar links may be present with many AI systems as well. As with our use of animals, our interactions with AI systems risk contributing to global threats that imperil us all. Human use of AI systems is already causing social and economic disruption, for instance by spreading misinformation, making jobs obsolete, and amplifying racism, sexism, speciesism, and other harmful attitudes contained in their training data.[66] And as AI systems become more powerful, they risk causing larger-scale harms, either because we lose control of them or because we retain control of them and use them for harmful purposes. Either way, risks such as global pandemics, nuclear war, and totalitarianism could increase.[67]

Additionally, and more fundamentally, when we oppress nonhumans with capacities and relationships that at least partly resemble our own, we reinforce oppressive beliefs, values, and practices that shape our treatment of each other.[68] For instance, many humans rationalize the

[61] *See, e.g.*, Oliver Jacobs et al., *Brief Exposure Increases Mind Perception to ChatGPT and Is Moderated by the Individual Propensity to Anthropomorphize*, PSYARXIV PREPRINTS (2023) (finding that exposure to the generative AI system ChatGPT significantly increased people's perceptions of agency and experience in ChatGPT), https://osf.io/preprints/psyarxiv/pn29d; Areleen Salles et al., *Anthropomorphism in AI*, 11 AJOB NEUROSCIENCE 88–95 (2020).

[62] *See* Michael Negnevitsky, *Artificial Intelligence: A Guide to Intelligent Systems*, PEARSON EDUC. LTD. (2005) (explaining that many AI systems focus on specific tasks, not emulating humans).

[63] Dan Lloyd, *What Is It Like to Be a Bot?: The world according to GPT-4*, FRONT. PSYCHOL. 2 (2023).

[64] Cardoso et al., *supra* note 35, at 5–7.

[65] *Id.* at 5–7.

[66] Daron Acemoglu et al., *Artificial Intelligence and Jobs: Evidence from Online Vacancies*, 40 J. OF LABOR ECON. S293–340 (2022); John Chelliah, *Will Artificial Intelligence Usurp White Collar Jobs?*, 25 HUM. RES. MGMT. INT'L DIG. 1–3 (2017); Mike Zajko, *Artificial Intelligence, Algorithms, and Social Inequality: Sociological Contributions to Contemporary Debates*, 16 SOCIO. COMPASS 1 (2022); Shayne Longpre et al., *Lethal Autonomous Weapons Systems & Artificial Intelligence: Trends, Challenges, and Policies*, 3 MIT SCI. POL'Y REV. 47–56 (2022).

[67] Nick Bostrom, *Superintelligence: Paths, Dangers, Strategies*, OXFORD UNIV. PRESS (2014) (exploring the future of AI and the risks they may pose to human civilization); Karina Vold & Daniel R. Harris, *How Does Artificial Intelligence Pose an Existential Risk?*, OXFORD HANDBOOK OF DIGIT. ETHICS, OXFORD UNIV. PRESS 3 (2021); Center for AI Safety, *Statement on AI Risk* (2023) (asserting that "mitigating the risk of extinction from AI should be a global priority alongside other societal-scale risks such as pandemics and nuclear war"), https://www.safe.ai/statement-on-ai-risk.

[68] Aph Ko & Syl Ko, *Aphro-ism: Essays on Pop Culture, Feminism, and Black Veganism from Two Sisters*, LANTERN PUBL'G. & MEDIA (2017) (exploring links between human and nonhuman oppressions with special focus on the links between racism, sexism, and speciesism); Sunaura Taylor, *Beasts of Burden*, THE NEW PRESS (2017) (analyzing the intersectionality of animal and disability liberation); Alice Crary & Lori Gruen, *Animal Crisis: A New Critical Theory*, WILEY (2022) (arguing that animal liberation and human emancipation are linked).

oppression of other humans through dehumanizing narratives that compare them to animals who are presumed to be "lesser than" due to perceived physical or cognitive differences. And when we reinforce the idea that nonhuman animals can be "lesser than" for these reasons, we also reinforce the idea that humans can be "lesser than" for these reasons, too. In this respect, human and animal liberation are, or at least can be, conceptually linked.[69]

In the future, similar links may be present with many AI systems as well.[70] Since many AI systems are designed to resemble humans, there is a risk that our interactions with humans and AI systems will be mutually reinforcing. For instance, if AI developers present digital assistants as women, will that reinforce the idea that women belong in subordinate roles?[71] And if users then tell digital assistants what to do without saying "please" or "thank you," will that reinforce the idea that individuals in subordinate roles can be treated with similar disregard? Granted, further research is needed to test these or other, similar hypotheses, but we should at least be open to these possible interconnections at this stage.

In the case of nonhuman animals, these links between human and nonhuman fates are part of the motivation for the One Health policy framework, which recognizes that human, animal, and environmental health are linked, and so our efforts to protect human, animal, and environmental health should be linked, too.[72] They are also part of the motivation for the Rights of Nature framework, which (in its 'instrumental value for collectives' form) extends legal personhood, rights, and/or standing to particular natural systems to create a mechanism for protecting the intrinsic value that they might have and/or the instrumental value that they might have for humans.[73] In the future, the same might be true for AI systems.

In any case, as noted above, my argument here will not depend on the idea that we owe it to *ourselves* to treat insects and AI systems differently, but will rather depend on the idea that we *might* owe it to *them*. As we will see, standard theories of welfare, moral standing, and legal standing treat either capacities such as sentience and agency or relationships such as contracts and communities as sufficient for these features and forms of standing.[74] I will suggest that when we consider insects, AI systems, and other nonhumans with appropriate caution and humility

[69] *Id.*

[70] *See, e.g.*, Matthew Kay et al., *Unequal Representation and Gender Stereotypes in Image Search Results for Occupations*, PROC. OF THE 33RD ANN. ACM CONF. ON HUM. FACTORS IN COMPUT. SYS., ASS'N FOR COMPUT. 3819–28 (2015) (evidencing that human bias and AI bias can be mutually reinforcing through finding that (i) online image search results for certain occupations slightly exaggerate humans' preexisting gender bias and (ii) the same search results reinforce and further perpetuate that bias).

[71] Rachel Adams & Nora Ni Loideain, *Addressing Indirect Discrimination and Gender Stereotypes in AI Virtual Personal Assistants: The Role of International Human Rights Law*, ANN. CAMBRIDGE INT'L. L. CONF. (2019).

[72] World Bank Group, *One Health: Operational Framework for Strengthening Human, Animal, and Environmental Public Health Systems at Their Interface*, THE WORLD BANK (2018), https://documents1.worldbank.org/curated/en/961101524657708673/pdf/122980-REVISED-PUBLIC-World-Bank-One-Health-Framework-2018.pdf; Kimberly Bernotas et al., *One Health, COVID-19, and a Right to Health for Human and Nonhuman Animals*, 23 HEALTH & HUM. RIGHTS J. 35–47 (2021); FAO et al., *One Health Joint Plan of Action (2022 - 2026)*, (2022), https://doi.org/10.4060/cc2289en; Centers for Disease Control and Prevention, *One Health*, (2023) (describing One Health as "a collaborative, multisectoral, and transdisciplinary approach — working at the local, regional, national, and global levels — with the goal of achieving optimal health outcomes recognizing the interconnection between people, animals, plants, and their shared environment"), https://www.cdc.gov/onehealth/.

[73] Christopher D. Stone, *Should Trees Have Standing?–Toward Legal Rights for Natural Objects*, 45 UNIV. S. CALIF. L. REV. 450–501 (1972); Craig M. Kauffman & Pamela Martin, *The Politics of Rights of Nature: Strategies for Building a More Sustainable Future*, MIT PRESS (2021).

[74] Andrews et al., *supra* note 5, at 13.

about these matters, we see that we should extend a vast number and wide range of nonhumans at least *some* legal protection for their own sakes, in the spirit of caution.

3. LEGAL PERSONHOOD

At present, many countries divide all beings into either of two basic categories: 'person' and 'non-person.' According to this distinction, to be a person is to have legal duties, legal rights, or both. In contrast, to be a non-person is to lack both of these statuses.[75] This view implies that personhood is an expansive category; for example, it can include individuals who lack duties, who have relatively few rights, or who have relatively weak rights. In this section, I discuss this conception of personhood, examining its connection with rights and standing. I also briefly discuss alternative conceptions of personhood that set a higher bar for this status, while supplementing it with other kinds of status such as "quasi-personhood."

As noted in section 1, I will focus here on one path towards legal personhood for insects and AI systems: a path involving *individual rights based on intrinsic value*. However, I want to reiterate that other paths are available too. For example, we might attribute individual *or* collective rights to particular nonhumans.[76] We might attribute individual or collective *duties* to particular nonhumans as well, especially future AI systems.[77] And we might take these steps only because particular nonhuman populations deserve these statuses, but also because these steps are instrumentally valuable for other, perhaps self-interested, purposes.[78] These paths all merit exploration too, but they will not be my focus in what follows.

With that in mind, what is it to have a legal right? Roughly, you have a legal right if you have a legal claim that a legal agent must consider, provided that you have legal standing relative to that claim and that agent.[79] Some legal rights are products of constitutional, federal, or state laws; the US constitution, for instance, establishes a right to free speech and assembly for US citizens.[80] In contrast, other legal rights exist prior to and independently of human laws; the US declaration of independence, for instance, recognizes that all humans have an "inalienable right" to life, liberty, and the pursuit of happiness independently of our citizenship status.[81] My focus in this paper will be on the latter category of legal rights.

[75] Kurki, *supra* note 1, at 6 ("one is a legal person if one holds *any* legal right or duty").

[76] *See* Kauffman & Martin, *supra* note 18 (charting a path to personhood for collectives based (partly) on instrumental value, a line of thought seemingly originating with Christopher Stone in 1972 that has seen a surge in interest as a growing number of jurisdictions begin to grant rights to natural entities).

[77] *See* McDonald, *supra* note 17 (providing an example of a path to personhood involving duties); *See also* Kingston, *supra* note 18 (discussing the question of legal liability for AI), *and* Lance Eliot, *AI Ethics And The Riddle Underlying Criminal Accountability Of AI, Including Crimes Committed By Revered AI-Based Self-Driving Cars*, FORBES (2022) ("the future might consist of assigning duty-bearing criminal accountability to various AI systems").

[78] *Compare* Margaret A. Palmer, *Ecosystem Services Lesson, Part 3: Intrinsic and Relational Values of Nature*, SESYNC (2023) ("nature has intrinsic value, meaning that ecosystems have the right to exist regardless of human needs and desires"), *with* Chilton & Jones, *supra* note 18 (arguing for rights for nature to protect human health), *and* Johnson et al., *supra* note 18 (demonstrating how rights for nature are economically beneficial).

[79] David Cassuto et al., *Legal Standing for Animals and Advocates*, 13 ANIMAL L. 63 (2006).

[80] U.S. CONST. amend. I.

[81] THE DECLARATION OF INDEP. para. 2 (U.S. 1776); *See* Joseph Raz, *Ethics in the Public Domain*, CLARENDON PRESS (1996), *and* Frances m. Kamm, *Rights*, OXFORD HANDBOOK OF JURIS. & PHIL. OF L., OXFORD UNIV. PRESS 476–513 (2004), *and* Frances M. Kamm, *Rights and Their Limits*, OXFORD UNIV. PRESS (2022), for discussion on legal and natural rights.

What, then, is it to have legal standing in a given case? You have legal standing in a given case if you satisfy the criteria for a legal agent like a court to hear your legal claim. The details vary from case to case and are a matter of debate, but standard criteria for legal standing in particular cases include: You endure a specific harm, there is a causal link between this harm and the alleged behavior, and a favorable verdict would be sufficiently likely to redress the harm.[82] If you count as a person with rights and standing, and if you are in the zone of interest that a particular statute or constitutional provision is intended to protect, then a legal agent like a court might have a responsibility to consider your claim.[83]

As this discussion suggests, there are several close links between the concepts of legal personhood, rights, and standing on this view. First, legal rights and standing are sufficient for legal personhood.[84] If you have legal rights and standing, then you count as a person. And second, legal rights are sufficient for at least the possibility of legal standing, and vice versa. If you have legal rights, then you can at least possibly have legal standing relative to those rights, and vice versa. Yes, you can have rights without actually having standing with respect to those rights in particular cases. But you cannot have rights without even possibly having standing with respect to those rights in any case. That would amount to not having rights.

Four general features of this framework for legal personhood, rights, and standing are worth emphasizing. First, and again, legal persons in this sense can have legal rights whether or not they have legal duties. 'Legal person' is a general category that includes what, following a standard distinction in ethics, we can call *legal agents* who can have *legal duties* as well as what we can call *legal patients* who can have *legal rights*.[85] Of course, many of us are legal agents *and* patients. But in principle, one can be either without being both. This is why many legal institutions rightly treat humans who lack the capacity for advanced language and reason as having *rights* whether or not they also treat these humans as having *duties*.[86]

Second, legal persons in this sense can have rights with different *contents*. Notably, the contents of our rights can depend on the contents of our interests or goals, which can vary.[87] For instance, we might think that humans and mice both have a right to free speech in a *general* sense, since we both have the ability to communicate, along with associated interests and goals. But we might also think that only humans can have a right to free speech in a certain specific sense, since only humans have the ability to *speak or write in propositional language*, along with associated interests or goals. On this view, it makes no sense to ask whether a mouse has the right to, say, practice journalism, since they lack the ability to do so.

[82] Friends of Earth, Inc. v. Laidlaw Environmental. Services, Inc, 528 U.S. 180, 181 (2000).; Cassuto et al., *supra* note 79, at 63.

[83] Cassuto et al., *supra* note 79, at 63.

[84] Kurki, *supra* note 1, at 7 (explaining the "Capacity-for-Rights View").

[85] Evelyn Pluhar, *Moral Agents and Moral Patients*, 4 BETWEEN THE SPECIES: A J. OF ETHICS 32–45 (1988) (adapting the terminological distinction between "moral agents" and "moral patients" commonly made by moral philosophers for use in a legal context).

[86] *E.g.,* Mental Capacity Act 2005, c. 9 (UK); Andrews et al., *supra* note 5, at 56 ("Infants, children, and those found not guilty by reason of insanity cannot be held accountable and cannot bear societal duties. They are, nonetheless, persons with rights").

[87] *Compare* Joseph Raz, *The Morality of Freedom*, OXFORD UNIV. PRESS (1998) (arguing for an "interest" theory of rights), *and* John Tasioulas, *On the Foundations of Human Rights,* PHIL. FOUND. OF HUM. RTS., OXFORD UNIV. PRESS (2015) (accepting the "interest" theory of rights), *with* H.L.A. Hart, *Legal Rights*, ESSAYS ON BENTHAM, OXFORD UNIV. PRESS 162–93 (1998) (accepting a "will" theory of rights).

Third, legal persons in this sense can have rights with different *strengths*. In some cases the strength of our rights can depend on the strength of our interests or goals, which can vary as well. For instance, we might think that humans and mice both have a right not to suffer because we both have the ability to suffer and a preference for avoiding suffering. But we might also think that humans can have a stronger right not to suffer because we have the ability to suffer *more*; our suffering can be more intense and/or prolonged. On this view, if an agent is deciding whether to allow a human or a mouse to suffer as much as they possibly can, they should treat the bar for allowing the human to suffer as higher, all else equal.[88]

Fourth, legal personhood is only one factor among many in our decisions about how to treat each other. There are many layers of legal and political status that bear on the content and strength of our rights, including not only legal personhood but also political citizenship and other relational statuses.[89] Additionally, our legal priorities can depend not only on which policies respect rights but also on which policies are best overall, which policies are democratically selected, which policies are realistically achievable and sustainable, and so on. In this respect, legal personhood might be the price of admission for legal rights and standing, but many other factors determine what follows for particular individuals in particular cases.

With that in mind, at present, many countries classify all and only humans (and some stand-ins for human interests, such as corporations) as legal persons.[90] Below, I will explain why this classification is a mistake. For now, what matters is that we observe that 'human' and 'person' are not synonymous under the law. 'Human' is a descriptive concept that refers to members of a particular species. In contrast, 'person' is a normative concept that refers to individuals who can hold duties or rights.[91] Thus, the idea that all and only humans (and some stand-ins for human interests) are legal persons is not merely definitional. It is a substantive claim about which beings can have duties and rights that requires a defense.[92]

Importantly, some experts believe that we should reject the binary distinction between persons and non-persons.[93] For example, some experts favor moving toward a three-part distinction between (1) legal persons, who merit full legal rights for their own sakes; (2) quasi-persons, legal beings, or sentient beings, who merit partial legal rights or other forms of legal protection for their own sakes; and (3) legal objects, which merit no legal rights or protection at all for their own sakes.[94] Additionally, many governments already classify animals in such

[88] *See* Jason Shukraft, *Moral Weight Series*, EFFECTIVE ALTRUISM F. (2020) (comparing the capacity for welfare and moral status across different groups of animals), https://forum.effectivealtruism.org/s/Yw5JeJHyhYQtYw8Z6, *and* Shelly Kagan, *How to Count Animals, More or Less*, *Uehiro Series in Practical Ethics,* OXFORD UNIV. PRESS (2022) (defending a moral hierarchy wherein some animals count more than others); Bob Fischer, *Weighing Animal Welfare: Comparing Well-Being Across Species*, OXFORD UNIV. PRESS (2024).

[89] Alasdair Cochrane, *Should Animals Have Political Rights?*, JOHN WILEY & SONS (2019) (arguing that animals require representation throughout the political process in addition to rights to protection).

[90] Andrews et al., *supra* note 5, at 17.

[91] Kurki, *supra* note 1, at 8.

[92] Andrews et al., *supra* note 5, at 13–40.

[93] *See, e.g.*, Fernandez, *supra* note 21 (arguing that "dichotomous thinking about nonhuman animals as either property or persons is unhelpful").

[94] *See, e.g.*, Fernandez, *Id.* (arguing for a "quasi-property/quasi-personhood" approach for the status of nonhuman animals), *and* Maneesha Deckha, *supra* note 21 (arguing for a "beingness" approach for the status of nonhuman animals).

middle-ground categories, including countries like France and the UK and cities like Mexico City and Quebec, and others are likely to follow suit.[95]

Classifying nonhumans as quasi-persons, legal persons, or sentient beings (we can henceforth use 'quasi-persons' as shorthand for this set of options, while noting that differences remain between them) has pros and cons that merit careful attention. On the one hand, while classifying nonhumans as quasi-persons might not be as good as classifying them as persons, it might still be better than classifying them as non-persons, which is the status quo.[96] Classifying nonhumans as quasi-persons might also be more tractable than classifying them as persons, at least in the short term, since the idea that nonhumans merit partial rights or other forms of protection might seem less radical than the idea that they merit full rights.

On the other hand, this middle-ground strategy raises difficult questions about what it means to merit partial legal rights or other forms of legal protection instead of meriting full legal rights. Insofar as nonhuman quasi-persons should have rights that properly reflect the contents and strengths of their interests for their own sakes (keeping in mind that nonhumans who possess fewer or weaker interests than humans can still have fewer or weaker rights than humans accordingly, even if they count as persons), this middle-ground status seems like personhood by another name. In contrast, insofar as nonhuman quasi-persons should lack such rights, this middle-ground status seems like non-personhood by another name.

This middle-ground strategy raises difficult questions about the legal status of many humans as well. For example, if we introduce a middle-ground category designed for individuals whose capacities are "higher" than those of, say, rocks but "lower" than those of, say, typical adult humans, then a lot depends on exactly where we set the bar for personhood. If we set the bar high enough to exclude all nonhumans, then we would likely exclude many humans as well. If we set the bar low enough to include all humans, then we would likely include many nonhumans as well. And if we simply stipulate that all and only humans are persons, then our legal classifications would still be at least somewhat arbitrary and speciesist.[97]

My own (lightly held) view is that preserving the binary distinction between persons and non-persons and interpreting personhood as an expansive category is better than creating a three-part distinction with a middle-ground category. The binary view allows us to preserve the simple idea that a legal person has legal duties, legal rights, or both, and that a legal non-person lacks both of these statuses. It also allows us to preserve the plausible and widely accepted idea that all humans are persons with rights and standing, without arbitrariness. Granted, it also requires us to accept the revisionary idea that many nonhumans are persons with rights and standing too. But as we will see, this idea can be made plausible as well.

Moreover, we might be able to modify the binary approach to further accommodate the intuitions that support a middle-ground category. For example, if we find the idea of nonhuman legal personhood confusing because we associate 'legal person' with humans or legal agents,

[95] Andrews et al., *supra* note 5, at 101–110.

[96] Kurki, *supra* note 1, at 4.

[97] *See* Lori Gruen, *Ethics and Animals: An Introduction*, CAMBRIDGE UNIV. PRESS, 64–75 (2011), *and* Evelyn Pluhar, *Beyond Prejudice: The Moral Significance of Human and Nonhuman Animals*, DUKE UNIV. PRESS, 62–123 (1995), for general discussion of this argument, sometimes called "the argument from marginal cases"; *See* Andrews et al., *supra* note 5, at 85–102, for a recent example of the use of the argument from marginal cases; *See* Robert Garner, *The Argument from Marginal Cases Revisited*, *in* A THEORY OF JUSTICE FOR ANIMALS: ANIMAL RIGHTS IN A NONIDEAL WORLD (Robert Garner ed., 2013), for a criticism of the argument from marginal cases.

then we can always replace it with a new term, such as 'legal subject'.[98] And if we see important distinctions between different kinds of legal persons or subjects, then we can always make corresponding terminological distinctions (say, between 'human persons / subjects' and 'ant persons / subjects,' and between 'persons / subjects who are agents' and 'persons / subjects who are patients.' More on these points below as well.

With that said, I support pursuing both of these approaches for now. They both imply that we can extend rights or protections to many nonhumans for their own sakes, which is what matters most. I might also be wrong about which approach is best, and either way, they can be mutually reinforcing in the short term even if one or the other is best in the long run. For instance, advocating for nonhuman personhood at present can shift the center of debate and pave the way for classifying (some) nonhumans as quasi-persons in the near future. And classifying (some) nonhumans as quasi-persons in the near future can then shift the goal posts and pave the way for classifying (some) nonhumans as persons in the long run.

In any case, I will not insist that we should preserve the binary distinction between persons and non-persons here. Instead, I will simply argue that *if* we preserve this distinction, *then* we should classify many insects and future AI systems as persons, with (at least limited, minimal) rights and standing. If my view that we should preserve this distinction is correct, then it follows that we should, in fact, classify these beings as persons. If not, then everything that I say here is compatible with the idea that we should at least classify them as quasi-persons, legal beings, or sentient beings instead. Either way, as we will see, what matters is that we treat them as legal subjects who merit legal rights or protections for their own sakes.

4. RISK AND UNCERTAINTY

When researchers and practitioners debate nonhuman personhood, they tend to proceed as though certainty is available — as though we can know for sure not only which criteria suffice for legal personhood but also which nonhumans satisfy these criteria.[99] But these issues are difficult and contested, and they call for caution and humility. We have a responsibility to reason about nonhuman personhood as we do about any other legal issue that involves high stakes and uncertain outcomes: We should take reasonable, proportionate steps to consider and mitigate realistic, non-negligible risks.[100] In this section I motivate this precautionary approach[101] to reasoning about the moral and legal circle, with an initial focus on the moral circle.

[98] Ethan Prall, *Animal Rights and Legal Personhood*, 110 CORNELL L. REV. 16 (forthcoming 2024); Kurki, *supra* note 1, at 17–20; Visa A.J. Kurki & Tomasz Pietrzykowski, *Legal Personhood: Animals, Artificial Intelligence and the Unborn*, SPRINGER INT'L. PUBL'G. 49–67 (2017) ("the proper legal approach to sentient animals should not be based on regarding them as non-human persons (as advocated by the main animal rights scholarship), but rather as non-personal subjects of law").

[99] *See, e.g.,* Kurki, *supra* note 1, at 6–9 (describing the "Orthodox View of legal personhood").

[100] *See* Carolyn Raffensperger, *Editor's Note: The Precautionary Principle - A Fact Sheet*, in *The Precautionary Principle - March 1998*, SEHN (2013) (summarizing the precautionary principle and explaining that "precaution" in the general sense is a "key element of the principle"), https://www.sehn.org/sehn/the-precautionary-principle-march-1998, *and* Lyana Francot-Timmermans & Ubaldus De Vries, *Eyes Wide Shut: On Risk, Rule of Law and Precaution*, 26 RATIO JURIS. 282 ("The rule of law offers legal certainty, laying down boundaries to the state's playing field. The precautionary approach stipulates that the absence of scientific certainty is no reason not to act to prevent harm").

[101] The concept of precaution can be used in a general sense, to refer to a commitment to considering and mitigating risk, as well as in a specific sense, to refer to a specific principle for doing so. I here use "precaution" in the general sense, though I briefly discuss the precautionary principle in the specific sense below.

As a general matter, we all agree that we should consider realistic, non-negligible risks when making decisions. For example, we all agree that driving drunk is wrong not because it will *definitely* harm or kill someone, nor even because it will *probably* do so, but rather, merely, because it has at least a *realistic, non-negligible chance* of doing so. Indeed, driving drunk might carry only a one in a hundred or one in a thousand chance of harming or killing someone. But if an action or policy has a one in a hundred or one in a thousand chance of harming or killing someone, then that constitutes a morally significant risk. This risk should at least be a factor in the decision, and in many cases it might even be a decisive factor.[102]

Granted, we might disagree about the details. One detail concerns *how* we consider risk. Some people think that we should accept a precautionary principle.[103] There are many interpretations of such a principle, but for present purposes, we can interpret it as holding that when in doubt about whether a particular harm will occur, we should assume that it will; that allows us to err on the side of caution, or hope for the best but plan for the worst. According to this principle, for instance, if you feel uncertain about whether a particular action or policy would kill 10,000 people, then you should assume that it would, in fact, have this effect, and you should ask if the action is worth it in light of that assumption.[104]

In contrast, other people think that we should use an expected value principle.[105] Once again, there are many interpretations of such a principle, but for present purposes, we can interpret the principle as holding that when in doubt about whether a particular harm will occur, we should multiply the probability of harm by the level of harm, and we should then treat the product of that equation as the expected amount of harm. According to this principle, for instance, if you think that a particular action carries a one in a thousand chance of killing 10,000 people, then you should assume that it would kill ten people (ten thousand divided by one thousand), and you should ask if the action is worth it in light of that assumption.[106]

Another detail concerns *when* we consider risk. Some people think that we should use a no threshold principle.[107] According to this principle, all risks merit consideration, including extremely low ones. For example, even if your action carried only a one in a *quintillion* chance of killing 10,000 people, you should still consider this possibility when making a decision. Granted, extremely low risks might carry extremely little weight in decisions. For instance, a one in a quintillion chance of killing 10,000 people amounts to killing only 0.0000000000001% of a

[102] Jeff Sebo, *The Moral Circle*, WW NORTON (2025); Jeff Sebo, *Moral Circle Explosion*, THE OXFORD HANDBOOK OF NORMATIVE ETHICS, OXFORD UNIV. PRESS (forthcoming).

[103] *See, e.g.,* Arie Trouwborst, *Prevention, Precaution, Logic and Law: The Relationship Between the Precautionary Principle and the Preventative Principle in International Law and Associated Questions*, 2 ERASMUS L. REV. 107–110 (2009) (explaining the precautionary approach to environmental law motivated in part by uncertainty about the extent of existing and future environmental impacts), *and* Noga Morag-Levine, *The History of Precaution*, 62 AM. J. OF COMPAR. L. 1095–1132 (2014) ("In its prescriptive sense the precautionary principle urges regulators to take stringent mitigation measures in the face of scientifically uncertain risks. In its permissive sense, the principle authorizes the state to regulate when the relevant harms are scientifically uncertain"), *and* Didier Bourguignon, *The precautionary principle: Definitions, applications and governance*, EUR. PARLIAM. RSCH. SERV. 12 (2015) (explaining the debate surrounding the precautionary principle in the European Union).

[104] Timothy O'Riordan & James Cameron, *Interpreting the Precautionary Principle*, 1st ed., ROUTLEDGE (1994).

[105] *Id.* at ch. 7.

[106] O'Riordan & Cameron, *supra* note 85, at ch. 7.

[107] *See* Hayden Wilkinson, *In Defense of Fanaticism*, 132 ETHICS 445–477 (2022) (defending "fanaticism," a no threshold principle in which even seemingly "fanatical" risks must be considered), *and* Jeffrey Sanford Russel, *On Two Arguments for Fanaticism*, NOÛS (2023) (evaluating the prospects for "fanaticism"), https://doi.org/10.1111/nous.12461.

person, in expectation, and this factor is unlikely to be decisive in the vast majority of decisions. But we should still give at least *some* weight to these possibilities.[108]

In contrast, other people think that we should use a threshold principle.[109] According to this principle, all and only risks above a particular probability threshold merit consideration. Different people set this probability threshold at different places, ranging from a one in ten thousand chance of harm to a one in ten quadrillion chance of harm. However, most if not all people agree that, at the very least, a *one in a thousand* chance of harm merits consideration. Thus, this principle might imply that you have a responsibility to give at least some weight to a one in a thousand chance of killing 10,000 people, but that you can give no weight at all to a one in a quintillion chance of doing so, depending on the details.[110]

In any case, what matters for present purposes is that all of these principles support the general idea that at least *non-negligible* risks merit at least *some* consideration. They also support the idea that a one in a thousand chance of causing harm counts as a non-negligible risk. When I refer to our standard framework for decision-making under risk and uncertainty in this paper, I mean these ideas and nothing more. As a result, when I argue that our current framework for legal personhood, coupled with our current framework for decision-making under risk and uncertainty, commits us to treating insects and some future AI systems as persons, nobody can reasonably accuse me of stacking the deck in favor of my view.

I elsewhere argue that this framework for decision-making risk and uncertainty has implications for attributions of moral standing. Without presenting the full argument here, I can present the general idea: When we decide whether to include particular beings in the moral circle (that is, when we decide whether to attribute moral standing to particular beings), we often need to make these decisions under both normative and descriptive uncertainty. Normatively, we often need to make these decisions under uncertainty about which properties or relations are sufficient for moral standing. And descriptively, we often need to make these decisions under uncertainty about which beings have these properties or relations.[111]

Why should we take ourselves to be uncertain about these issues? One reason is that this topic forces us to confront some of the hardest problems in science and ethics, such as the nature of other minds and the nature of morality.[112] Since the only kind of mind that any of us can directly access is our own, we lack certainty about what, if anything, it feels like to be other kinds of being, and whether, if at all, they can access the same forms of intrinsic value as us, and vice versa.[113] Since our actions and policies affect other beings whether we like it or not, we

[108] *Id.*

[109] *See* Nicholas J.J. Smith, *Is Evaluative Compositionality a Requirement of Rationality?*, 123 MIND, A Q. REV. OF PSYCH. & PHIL. 457–502 (2014), *and* Bradley Monton, *How to avoid maximizing expected utility*, 19 PHILOSOPHERS' IMPRINT 1–25 (2019), *and* Nick Beckstead & Tiruji Thomas, *A Paradox for Tiny Probabilities and Enormous Values*, NOÛS (2023), https://doi.org/10.1111/nous.12462, for discussion of the threshold principle.

[110] *Id.*

[111] Sebo, *The Moral Circle*, *supra* note 97; Sebo, *Moral Circle Explosion*, *supra* note 97.

[112] *See, e.g.*, David J. Chalmers, *Facing Up to the Problem of Consciousness*, 2 J. OF CONSCIOUSNESS STUD. 200–19 (1995) (examining the "hard problem of consciousness": how physical processes can give rise to conscious experience).

[113] *See* Peter Carruthers, *The Problem of Other Minds*, *The Nature of the Mind*, ROUTLEDGE (2004) (discussing the epistemological problem of other minds).

should attempt to determine which beings matter as best we can. But since our perspectives are limited, we should also proceed with caution and humility.[114]

Another reason we should take ourselves to be uncertain about these issues is that we have clear biases about them. For example, we have a disposition towards *anthropomorphism*, that is, a tendency to accept that nonhumans *have* human traits even when they *lack* them.[115] This disposition is particularly strong when we "see ourselves" in nonhumans, and/or when we treat them as companions, as with chatbots.[116] However, we also have a disposition towards *anthropodenial*, that is, a tendency to accept that nonhumans *lack* human traits even when they *have* them.[117] This disposition is particularly strong when we fail to "see ourselves" in nonhumans, and/or when we treat them as commodities, as with many animals.

Mistakes about moral standing can be harmful in both directions. On the one hand, over-attribution of moral standing can lead us to prioritize beings that *lack* moral standing over beings that *have* it.[118] If insects and AI systems lacked moral standing, for instance, it would be bad for us to allocate scarce resources toward them instead of humans and other vertebrates. On the other hand, under-attribution of moral standing can lead us to harm or neglect beings who have moral standing.[119] If insects and AI systems had moral standing, for instance, it would be bad for us to scale up industries that create, use, and destroy trillions, quadrillions, or quintillions of AI systems per year without any consideration for their welfare or rights at all.

Making decisions about moral standing in this predicament requires comparing the risks of over-attribution with the risks of under-attribution. In some cases it might be clear which risks are worse and in other cases it might not be clear. But for present purposes, it will be enough to observe that the risks of under-attribution are generally bad enough that it would be a mistake to simply *err on the side of total exclusion* in cases of uncertainty about whether other beings have moral standing.[120] If there is a non-negligible risk that insects, AI systems, or other such beings have moral standing and our actions and policies are affecting them, then we should extend these beings at least *some* consideration when making decisions that affect them.

Of course, as in other contexts, the details matter. For example, if we generally accept a precautionary principle, then when in doubt about whether someone matters, we should perhaps simply assume that they do.[121] In contrast, if we generally accept an expected value principle, then when in doubt about whether someone matters, we should multiply the probability that they matter by how much they would matter if they did, and we should then assume that they have the resulting amount of value. For this reason, the expected value principle will generally produce a

[114] Jeff Sebo, *The Moral Problem of Other Minds*, 25 HARVARD REV. OF PHIL. 51–70 (2018); Joshua C. Gellers, *AI ethics discourse: a call to embrace complexity, interdisciplinarity, and epistemic humility*, 39 AI & SOC'Y. 2593–94 (2024); Long et al., *supra* note 53, at 6.

[115] *Anthropomorphism*, BRITANNICA.COM, https://www.britannica.com/topic/anthropomorphism (last visited Nov. 15, 2024).

[116] Sarah Gibbons et al., *The 4 Degrees of Anthropomorphism of Generative AI*, NIELSEN NORMAN GRP. (2023).

[117] F.B.M. de Waal, *Are We in Anthropodenial?*, 18 DISCOVER 7, 50–53 (1997) ("I will call it anthropodenial: a blindness to the humanlike characteristics of other animals, or the animal-like characteristics of ourselves").

[118] Long et al., *supra* note 53, at 8.

[119] *Id.* at 7.

[120] *Id.* at 6–10.

[121] *See* Sebo, *supra* note 95, at 51–70 (However, please note that this analysis assumes that the risks of under-attribution are worse than the risks of over-attribution. While this assumption plausibly holds in many cases, it might not hold in all cases; hence the word 'perhaps' in this sentence.)

more hierarchical version of the moral circle than the precautionary principle, since it will give more weight to beings who are likelier to matter, all else equal.

Similarly, if we generally accept a no threshold principle, then when in doubt about whether someone matters, we should include them in the moral circle as long as they have *any chance at all* of mattering. In contrast, if we generally accept a threshold principle, then when in doubt about whether someone matters, we should include them in the moral circle only if they have a *non-negligible chance* of mattering. For this reason, the threshold principle will generally produce a smaller moral circle than the expected value principle, since it will exclude at least *some* potentially sentient or otherwise significant beings (for instance, beings with only a one in a quintillion chance of mattering), all else equal.

But as before, all of these principles support the general idea that we should extend at least *some* consideration to beings with at least a *non-negligible* (that is, at least a *one in a thousand*) chance of mattering. In keeping with my pluralism in this paper, I will assume that and nothing more. This assumption makes my argument compatible with everything from the inclusive and egalitarian view that we should give all potential moral patients equal weight to the exclusionary and hierarchical view that we should give some potential moral patients less weight than others, and we should give other potential moral patients no weight at all (depending on how likely they are to matter and/or how much they would matter if they did).

And if we assume at least this much, then insects, AI systems, and other beings plausibly make the cut. First, experts now widely agree that sentience suffices for moral standing, but they still disagree about whether other features — say, agency — suffice too.[122] And while we might feel confident that only sentient beings matter, it would be a mistake to be certain about that at this stage. Given the difficulty of these questions and our long track record of bias about them, we should allow for *at least* a one in a thousand chance that, say, anyone who can set and pursue their own goals based on their own beliefs, desires, and intentions merits moral consideration whether or not they can experience pleasure, pain, or other such states as well.

Second, experts now widely agree that beings with complex, carbon-based brains — say, mammals and birds — can be sentient, but they still disagree about whether nonhumans with simpler and/or silicon-based brains — say, insects or future AI systems — can be sentient.[123] And while we might feel confident that only the former beings can be sentient, it would once again be a mistake to be certain about that at this stage. Given the difficulty of these questions and our long track record of bias about them, we should once again allow for *at least* a one in a

[122] *See, e.g.*, Sarah Chan & John Harris, *Human Animals and Nonhuman Persons,* THE OXFORD HANDBOOK OF ANIMAL ETHICS (2011) (exploring a variety of attributes that are considered important to being classified as a person with moral standing).

[123] *See* Jonathan Birch, *The Edge of Sentience: Risk and Precaution in Humans, Other Animals, and AI,* OXFORD UNIV. Press (2024) (arguing that some animals, such as adult vertebrates, cephalopods, and certain crustaceans, are sentient and that animals with simpler brains may not be sentient but may have conscious experiences that demand ethical consideration), *and* Butlin et al., *supra* note 29 (analyzing AI consciousness and arguing that while no current AI systems are conscious, AI systems may be conscious in the future), *and* The NY Declaration on Animal Consciousness (2024) (evidencing wide agreement amongst experts that "there is strong scientific support for attributions of conscious experience to other mammals and to birds" and "the empirical evidence indicates at least a realistic possibility of conscious experience in all vertebrates (including reptiles, amphibians, and fishes) and many invertebrates (including, at minimum, cephalopod mollusks, decapod crustaceans, and insects)"), https://sites.google.com/nyu.edu/nydeclaration/declaration, *and* Sebo & Long, *supra* note 57 (arguing that some AI systems have a non-negligible chance of being conscious by 2030).

thousand chance that, say, insects and future AI systems can be sentient given their capacities for perception, attention, learning, memory, planning, problem solving, and more.[124]

In my view, then, when we consider whether to include insects and AI systems in the moral circle with sufficient caution and humility, we have no choice but to conclude that many of them have *at least* a one in a thousand chance of being sentient or otherwise significant, given the evidence currently available. It follows that we should extend many of these beings at least *some* moral consideration when making decisions that affect them. We might give more weight to humans and other vertebrates, since, for example, humans and other vertebrates might be more likely to matter and might have more, and stronger, interests. But we should give at least *some* weight to many insects and future AI systems too, even if only very little.

5. LEGAL CIRCLE EXPANSION

If, then, we combine this framework for legal personhood with this framework for decision-making under risk and uncertainty, the result is a conditional case for insect and AI legal personhood. There is a realistic possibility that many insects and future AI systems merit legal rights or protections for their own sakes. Thus, *if* we should maintain a binary distinction between persons and non-persons, *then* we should classify many insects and future AI systems as persons, in the spirit of caution and humility. In this section, I provide a high-level argument for this conclusion, focusing on four commonly proposed bases for legal personhood: species membership, contracts, communities, and capacities.[125]

A simple, direct argument for treating many insects and AI systems as legal persons would proceed as follows: (1) If we should treat a being as at least minimally morally considerable, then we should treat them as at least minimally legally considerable. (2) If we should treat a being as at least minimally legally considerable, then we should treat them as a legal person (assuming the binary view). (3) We should treat many insects and AI systems as at least minimally morally considerable, for the reasons noted above. (4) Thus, we should treat these beings as at least minimally legally considerable, and so as legal persons. I personally find this argument compelling, but in what follows I will set it aside.

As noted above, the prevailing views about legal personhood, at least in the US, fall into four categories: the species membership, contracts, communities, and capacities views.[126] And three of these views — contracts, communities, and capacities — admit of at least two interpretations: a stronger, more demanding interpretation that excludes at least some humans from the legal circle, and a weaker, less demanding interpretation that includes at least some nonhumans in the legal circle. To decide whether to include insects and AI systems as legal persons, then, we need to estimate how likely each view is to be correct, as well as how likely insects and AI systems are to be legal persons according to each view.

Take the species membership view about legal personhood first. This view holds that membership in the species *Homo sapiens* is the basis for legal personhood.[127] And the reason for

[124] Ian J.H. Duncan, *The changing concept of animal sentience*, 100 APPLIED ANIMAL BEHAV. SCI. 11–19 (2006); Helen Lambert et al., *Wouldn't hurt a fly? A review of insect cognition and sentience in relation to their use as food and feed*, 243 APPLIED ANIMAL BEHAV. SCI. (reviewing scientific literature on insect sentience); Cade Metz, *A.I. Is Not Sentient. Why Do People Say It Is?*, INT'L. N.Y. TIMES (2022).

[125] *See* Andrews et al., *supra* note 5 (examining "The Species Membership Conception," "The Social Contract Conception," "The Community Membership Conception," and "The Capacities Conception").

[126] *Id.*

[127] Andrews et al., *supra* note 5, at 17.

this requirement is *not* that all and only members of the species *Homo sapiens* have particular capacities or relationships (since in that case, the species membership view would reduce to the contract, community, or capacities view, which we can consider in a moment). The reason is instead, simply, that members of the species *Homo sapiens* are members of the species *Homo sapiens*. We can have legal duties or rights simply because we have a particular set of genes, and we belong to a particular scientific taxonomic category.

As I and others argue elsewhere, the species membership view is implausible.[128] As with other scientific taxonomic categories, species membership is not, *in and of itself*, the kind of category that can serve as the basis for rights. Granted, it might correspond to *other* features that can play this role, such as the ones targeted by other theories of personhood (though, as we will see, it corresponds to these features only imperfectly). But it cannot play this role itself. We can see this clearly when we reflect on why *we* merit rights. Do you need to take a genetic test to confirm that you have a right to life, liberty, or the pursuit of happiness? Of course not. Your awareness of your own thoughts, feelings, projects, and relationships is enough.

With that said, we can grant that if the species membership view *were* correct, then nonhumans, ranging from mammals and birds to insects and AI systems, would not count as legal persons.[129] So, to the extent that we allow for the possibility that this view is correct despite its implausibility, we must also allow for the possibility that none of these nonhumans is a legal person. While I personally think that the species membership view is *very* unlikely to be correct, I will assume for the sake of argument that this view is as likely to be correct as the other three. As we will see, we can have a responsibility to include insects and AI systems in the legal circle even if we give substantial weight to this view under uncertainty.

Now take the contracts view. This view holds that social contracts are the basis for legal personhood.[130] A social contract is an agreement among members of society that defines our duties to each other and rights against each other.[131] A stronger, more demanding form of this view holds that only rational agents can be contractors, and that only contractors can have rights. In contrast, a weaker, less demanding form of this view holds that non-rational agents can be contractors as well (since they can implicitly agree to shared norms via their behavior), and/or that non-contractors can have rights as well (since contractors can agree that particular non-contractors deserve rights in virtue of their capacities or relationships).

As I and others argue elsewhere, a weaker contracts view is more plausible than the stronger one.[132] After all, the stronger contracts view excludes not only all nonhumans but also many humans, since none of us possesses the capacity for rationality early in life, many of us lose this capacity later in life, and many of us never develop this capacity at all. Yet we rightly count as legal persons in these moments despite our inability to explicitly agree to contracts. The contracts view can explain this inclusion in either of two ways: The ability to explicitly agree to

[128] Andrews et al., *supra* note 5 at 17–38.

[129] Of course, this analysis depends not only on the assumption that the species membership view is correct, but also on the assumption that *Homo sapiens* is the relevant species! *See* Dale Jameison, *Ethics and the Environment*, CAMBRIDGE UNIV. PRESS 102–144 (2008) for different interpretations and assessments of a species membership view.

[130] Andrews et al., *supra* note 5, at 38.

[131] *Social Contract*, MERRIAM-WEBSTER.COM, (https://www.merriam-webster.com/dictionary/social%20contract) (last visited Nov. 4, 2024).

[132] Andrews et al., *supra* note 5, at 48–66.

a contract is not necessary for being a party to that contract, and/or being a party to a contract is not necessary for being granted rights according to that contract.[133]

With that in mind, insofar as we give weight to the stronger contracts view, we can rule out insect personhood, though we should stay open to AI personhood, since we should stay open to the possibility that some future AI systems will have the capacity for rationality. And insofar as we give weight to a weaker contracts view, we should stay open to insect *and/or* AI personhood. In particular, if an individual can be granted rights under a social contract without being a party to the contract, then it becomes a substantive normative question whether to grant insects and AI systems rights under our social contracts. Plausibly, we need to consider their capacities and/or relationships in order to answer this question..

With that in mind, we can now consider the communities view. This view holds that community is the basis for legal personhood.[134] A community is a group of individuals bound together by shared beliefs, values, or practices.[135] A stronger, more demanding form of this view defines these commonalities in specific terms; for example, it might require a relatively complex culture in which everyone fully participates. In contrast, a weaker, less demanding form of this view defines these commonalities in general terms; for example, it might require only a relatively simple shared culture in which everyone fully participates, or a relatively complex shared culture in which some participate more than others.

The analysis is the same as before.[136] The stronger communities view implausibly excludes many humans from the legal circle. After all, in the same way that many humans lack the ability to explicitly agree to social contracts, many humans also lack the ability to fully participate in specific cultural practices (say, complex religious rituals that require advanced language and reason). Yet these humans rightly count as legal persons anyway. Like the contracts view, the communities view can explain this inclusion in either of two ways: The ability to fully participate in such practices is not necessary for full participation in a community, and/or full participation in a community is not necessary for rights in that community.

With that in mind, insofar as we give weight to the stronger communities view, we can once again rule out insect personhood, though we should once again stay open to AI personhood, since we should stay open to the possibility that at least some AI systems will be able to fully participate in specific cultural practices. And insofar as we give weight to a weaker communities view, we should stay open to insect *and/or* AI personhood. Plausibly, some insects (particularly social insects with the capacity for social learning, like ants and bees) and future AI systems (particularly advanced AI systems designed to be assistants or companions) can at least partly participate in at least simple, general social or cultural practices.

Finally, take the capacities view. This view holds that capacities are the basis for legal personhood.[137] The capacities discussed in this literature tend to overlap with the ones discussed in the literature on moral standing. A stronger, more demanding form of this view requires a relatively complex, specific set of capacities, such as the capacity for rational agency (the ability

[133] Andrews et al., *supra* note 5, at 52 ("the plausibility of social contract theory depends on the possibility of persons who are not contractors — either because they choose not to contract (e.g., adults who opt for life in the state of nature) or because they cannot contract (e.g., infants and some individuals with cognitive disabilities)").

[134] Andrews et al., *supra* note 5, at 69.

[135] *Community*, MERRIAM-WEBSTER.COM, (https://www.merriam-webster.com/dictionary/community) (last visited Nov. 4, 2024).

[136] Andrews et al., *supra* note 5, at 61–76.

[137] Andrews et al., *supra* note 5, at 85.

to rationally assess your own beliefs, desires, and intentions). In contrast, a weaker, less demanding form of this view requires a relatively simple, general set of capacities, such as the capacity for sentience (the ability to feel pleasure or pain) or agency (the ability to set and pursue goals based on beliefs, desires, and intentions).[138]

The analysis is once again the same as before.[139] The stronger capacities view implausibly excludes many humans from the legal circle, many humans lack the ability to rationally assess their beliefs, desires, and intentions. (Indeed, this is part of why many humans lack the ability to explicitly agree to social contracts or fully participate in specific cultural practices.) Yet we rightly count as legal persons anyway. The capacities view can explain this conclusion by noting that while some rights (such as the right to enter into a contract) require rational agency, other rights (such as the right to be free from abuse or neglect) require only sentience, agency, or other such capacities that can exist without rational agency.

The implications for insects and AI systems are roughly the same as with the previous two views. Insofar as we give weight to the stronger capacities view, we can once again rule out insect personhood, though we should once again stay open to AI personhood, since we should stay open to the possibility that at least some AI systems will have rational agency. And insofar as we give weight to a weaker capacities view, we should be open to both kinds of personhood for the reasons discussed throughout this paper: We are simply not in a position to know for sure whether many insects and AI systems are, or will be, sentient, agentic, or otherwise morally significant given the evidence currently available.[140]

We can now take stock. When we assess these issues with appropriate caution and humility, it seems clear that there is at least a realistic possibility that many insects and AI systems do, or will, count as legal persons. The species membership view is arbitrary. The stronger contract, community, and capacities views are unacceptably exclusionary. And weaker formers of these views are potentially compatible with insect and/or AI legal personhood. At present, there is a decent chance that many insects are sentient, agentic, or otherwise morally significant, such that they deserve rights under our contracts and/or within our communities. In the future, the same will be true of many AI systems as well.

In fact, this conclusion holds even if we make implausibly skeptical probability estimates about these issues. For example, suppose that we take the species membership, contracts, communities, and capacities views to each have a one in four chance of being correct, and suppose that we take the stronger and weaker forms of the latter three views to each have a one in eight chance of being correct. Now suppose that we take many insects and AI systems to have no chance at all of being legal persons according to the species membership view or stronger forms of the latter three views, and suppose that we take them to have only a one in eight chance according to the weaker forms of the latter three views.

I think that these estimates are implausibly skeptical for several reasons: The species membership view is less plausible than the other three views; the stronger forms of the other three views are less plausible than the weaker forms; many future AI systems have a higher than zero chance of counting as legal persons on the stronger forms; and many insects *and* future AI systems have a higher than one in eight chance of counting as legal persons on the weaker forms. However, my present point is simply this: Even if we do make these estimates, we still arrive at a

[138] Long et al., *supra* note 23; Jeff Sebo, *Agency and Moral Status*, 14 J. OF MORAL PHIL. 1 (2017).

[139] Andrews et al., *supra* note 5, at 77–100.

[140] Ian J.H. Duncan, *supra* note 23; Lambert et al., *supra* note 23 (reviewing scientific literature on insect sentience); Metz, *supra* note 23.

roughly *one in twenty* chance that many insects and future AI systems count as legal persons — clearly a realistic, non-negligible possibility that merits consideration.[141]

6. OBJECTIONS AND REPLIES

Of course, we must be practical. Even if we should treat insects and AI systems as legal persons *in theory*, we might not always be able to achieve and sustain this ideal *in practice*. In particular, we might worry that extending legal personhood to such a vast number and wide range of nonhumans would be unacceptably demanding and disruptive.[142] In this section, I consider these demandingness and disruption objections to insect and AI personhood. I argue that insect and AI personhood would not, in fact, be unacceptably demanding or disruptive, in part because they might not be *that* demanding or disruptive, and in part because insofar as they *are* demanding and disruptive, that might be acceptable.

First, consider the demandingness objection. This objection holds that insect and AI personhood are unacceptably demanding. As we have seen, the world contains quintillions of insects across millions of species, and in the future, the world could contain an even vaster number and wider range of AI systems (to say nothing of other potentially morally significant nonhumans). Meanwhile, our legal systems still lack the epistemic, practical, and motivational resources needed to respond appropriately to legal personhood within our own species.[143] Thus, extending legal personhood not only to, say, chimpanzees and elephants but also to, say, insects and AI systems would stretch our capacity to the breaking point.

My response to this objection comes in three parts. First, treating insects and AI systems as legal persons might not be *that* demanding. We have already seen that insects and AI systems might have fewer and weaker rights than us in some cases. We can now add that respecting the rights of others can be compatible with meeting our own basic needs. For example, we accept

[141] As a reminder, if we supplement the categories of legal person and legal non-person with categories like quasi-person, legal being, or sentient being, then we might be able to classify many insects and/or AI systems in this supplemental category instead. However, even in this scenario we might still need to classify many of these beings, particularly future AI systems with advanced language and reason, in the personhood category. In any case, as noted above, I am not taking a stand in this paper on whether we *should* add a supplemental category to our framework for basic legal status. I am instead merely making the conditional claim that *if* we preserve the binary distinction between persons and non-persons, *then* we should classify many insects and future AI systems as persons. And if we add a supplemental category to this list, then we should classify these beings *either* as persons *or* as, say, quasi-persons; but either way we should not classify these beings as mere non-persons, undeserving of any legal rights or protections at all for their own sakes.

[142] *See Breheny*, 38 N.Y.3d at 574–576 (N.Y. Ct. App. 2022) (arguing that granting Happy the elephant personhood is objectionable based on both demandingness ("slippery slope") and disruptiveness grounds ("a 'sweeping pronouncement[ ]' of nonhuman animal personhood lacking in legal foundation that would displace the carefully devised state and federal statutory frameworks governing animal welfare")); Letter-Brief of Amicus Curiae Richard L. Cupp Jr. in Opposition to Petitioner-Appellant's Appeal of Denial of Petition for Writ of Habeas Corpus and Order to Show Cause, Matter of Nonhuman Rights Project, Inc. v Lavery, 152 A.D.3d 73 (N.Y. Sup. Ct. App. Div. 1st Dep't 2017) ("there is no clear or even fuzzy line regarding how far animal legal personhood, if recognized, might extend"); Claudio Novelli, *AI and Legal Personhood: A Theoretical Survey*, Univ. of Bologna 151–152 (2022) (describing the demanding and disruptive effects on legal and regulatory systems that could result from granting legal personhood to AIs), https://amsdottorato.unibo.it/10392/1/Legal%20Personhood_A%20theoretical%20survey%20%281%29.pdf.

[143] *See, e.g.*, Miguel E. Vatter & Marc De Leeuw, *Human Rights, Legal Personhood and the Impersonality of Embodied Life*, SAGE PUBL'NS. (2019) (analyzing the historical and ongoing debate on legal personhood for humans).

that humans have a right to life, but we also accept that we can be killed in self-defense, in other-defense, as a side effect of especially important activity, and even, on some views, as a means to sufficiently important ends (say, killing one to save a hundred, or thousand, or million).[144] These exceptions can all apply for insects and AI systems too.

Similarly, legal standing can take different forms.[145] Given the vast number and wide range (and, in many cases, short lives) of insects and AI systems, we might not be able to provide them all with the same kind of due process that we provide fellow humans. But we might still be able to provide them with other kinds of due process. For example, even if a judge might not be able to hear the claims of each of the billions of insects or chatbots being used at any given time by a particular company, they might be able to hear the claims of all of these beings at once — the ultimate class action lawsuit. Such a process might or might not be ideally just, but it can still be more just than no process for hearing these claims at all.

Second, insofar as treating insects and AI systems as legal persons *is* demanding, this result might be acceptable. Even when we focus on human populations, we can see that treating vulnerable populations as they deserve can be demanding.[146] This is especially true when the world contains a lot of conflict and need, and when our shared structures disproportionately benefit some and burden others.[147] In these cases, we have a responsibility to do what we can to address these issues, even if that requires a modest (achievable and sustainable) level of self-sacrifice. The same can be true, in different ways and to different degrees, for vulnerable nonhuman populations, including insects and AI systems.

Granted, the idea that the law can be so demanding might still *feel* unacceptable. But we should take this feeling with a grain of salt, since we not only have clear biases against insects, AI systems, and other nonhumans, but we also have a clear incentive to maintain our position of power and privilege over these populations.[148] Moreover, we should keep in mind that what feels demanding now might not feel as demanding in the future. Our ability to improve our interactions with insects and AI systems might be limited at present, due to the limits of our shared structures, knowledge, power, and motivation. But the more we change these conditions, the more we might be able to improve our interactions with these beings.[149]

Third, insofar as treating insects and AI systems as legal persons *is* unacceptably demanding, the upshot is not that insects and AI systems are, in fact, non-persons. The upshot is instead simply that the world is tragic. As noted above, our legal systems are currently incapable

[144] Judith Jarvis Thomson, *Self-Defense*, 20 PHIL. & PUB. AFF. 288–310 (1991); Nancy M. Omichinski, *Applying the Theories of Justifiable Homicide to Conflicts in the Doctrine of Self-Defense*, 33 WAYNE L. REV. 1447–1470 (1987).

[145] Matthew Hall & Christian Turner, *The Nature of Standing*, 29 WM. & MARY BILL RTS. J. 67 (2021).

[146] *E.g., Biden's Budget: A Future That's Built on Government Dependence,* HOUSE COMMITTEE ON THE BUDGET (2023) ("In fiscal year 2022, the federal government spent $1.19 trillion on more than 80 different welfare programs"), https://budget.house.gov/press-release/7582#:~:text=In%20 fiscal%20 year%202022%2C%20the,%249%2C000%20spent%20per%20American%20household.

[147] *See, e.g.,* National Academies of Sciences et al., *Communities in Action: Pathways to Health Equity, The Root Causes of Health Inequity* (2017) (analyzing how the unequal allocation of power and resources results in inequity); *See also* Jeff Sebo, *Kantianism for Humans, Utilitarianism for Nonhumans? Yes and No*, 180 PHIL. STUD. 1211 (2022).

[148] *See, e.g.*, Robert Long et al., *Taking AI Welfare Seriously*, ARXIV 6–10 (2024) (on the risks of over- or under-attributing minds to nonhuman systems): "[W]hen we consider the mechanisms that produce nonhuman behavior — taking what Daniel Dennett has called taking a "mechanistic stance" towards nonhumans — we become less likely to attribute mental states to those nonhumans."

[149] *See* Jeff Sebo, *Saving Animals, Saving Ourselves: Why Animals Matter for Pandemics, Climate Change, and Other Catastrophes*, OXFORD UNIV. PRESS 66–90 (2022) .

of treating every *human* as they deserve. Insofar as our legal systems lack this capacity, does it mean that the humans who slip through the cracks are not, in fact, persons with rights or standing? Or does it instead mean that the world is tragic, and that we might not always be able to treat others as they deserve? Clearly it means the latter. And the same can be true for nonhumans, ranging from mammals and birds to insects and AI systems.

Granted, one might argue that there is no point in *recognizing* beings as legal persons when we lack the ability to *treat* them as legal persons. But first, I have suggested that we might be able to treat insects and AI systems as persons in at least some respects, and to at least some extent, even if we lack the ability to do so in all respects, and to the fullest extent. I have also suggested that our ability to treat them as persons might increase over time. In the meantime, we can at least recognize many insects and AI systems as legal persons whether or not we have the ability to act accordingly yet. Basic recognition is the very least we can do. It will also make us more likely to improve our ability to treat these beings as legal persons over time.

The upshot is that the demandingness objection is reasonable but not, I think, compelling. Yes, we should clearly not attempt to do more for insects, AI systems, and other such beings than we can realistically achieve or sustain. But if they have a realistic, non-negligible chance of satisfying the criteria for legal personhood, rights, and standing, then we should still recognize them as at least minimal legal persons, with at least minimal legal rights and standing, in the spirit of caution and humility as we attempt to do more. We should then do as much as we can realistically achieve and sustain, and to the extent that our capacity to do more for them increases, our responsibility to do more for them will increase as well.

Now consider the disruption objection. Again, this objection holds that insect and AI personhood would be too disruptive, not only to our legal, political, and economic systems but also to basic concepts like personhood, rights, and standing.[150] As we have seen, there are many relevant differences between the kinds of legal consideration that humans, insects, AI systems, and other nonhumans should receive. Thus, if we use the same concepts (personhood, rights, and standing) to describe these different kinds of consideration, then we risk obscuring these differences and mistreating one or more of these populations. Either way, this change would transform important legal concepts and frameworks past their breaking points.

My response to this objection comes in three parts as well. First, treating insects and AI systems as legal persons might not be *that* disruptive. Recall that legal personhood is already an expansive concept that can include agents and patients, different kinds of duties and rights, and different kinds of standing. For example, we rightly classify both adults and children as legal persons. Does that classification obscure relevant differences between these populations? Do we accidentally force children to pay taxes or force adults to attend school? No. Instead, we rightly treat these populations as similar in some ways and different in others. The same can be true for humans, insects, AI systems, and other nonhuman populations.

[150] *See Breheny*, 38 N.Y.3d at 574–576 (N.Y. Ct. App. 2022) (arguing that granting Happy the elephant personhood is objectionable based on both demandingness ("slippery slope") and disruptiveness grounds ("a 'sweeping pronouncement[ ]' of nonhuman animal personhood lacking in legal foundation that would displace the carefully devised state and federal statutory frameworks governing animal welfare")), *and* Letter-Brief of Amicus Curiae Richard L. Cupp Jr. in Opposition to Petitioner-Appellant's Appeal of Denial of Petition for Writ of Habeas Corpus and Order to Show Cause, Matter of Nonhuman Rights Project, Inc. v Lavery, 152 A.D.3d 73 (N.Y. Sup. Ct. App. Div. 1st Dep't 2017) ("there is no clear or even fuzzy line regarding how far animal legal personhood, if recognized, might extend"), *and* Novelli, *supra* note 140 (describing the demanding and disruptive effects on legal and regulatory systems that could result from granting legal personhood to AIs), https://amsdottorato.unibo.it/10392/1/Legal%20Personhood_A%20theoretical%20survey%20%281%29.pdf.

Granted, treating insects and AI systems as legal persons might change how we interpret the concepts 'personhood,' 'rights,' and 'standing' in some ways. For example, it might make the expansiveness of these categories more salient to us, and it might motivate us to modify our discourse and practice around legal consideration in some ways as a result. For instance, when discussing personhood, rights, and standing in the human context, we might start using general terms like 'person,' 'rights,' and 'standing' less, and we might start using specific terms like 'human person,' 'human rights,' and 'human standing' more. But this kind of conceptual and linguistic evolution is common and, in this case, welcome.[151]

Second, insofar as treating insects and AI systems *is* disruptive in the relevant sense, this result might be acceptable. All conceptual options carry morally significant risks. In this case, using the same concept to describe the kind of legal consideration that humans, insects, AI systems, and other nonhumans deserve risks leading us to overestimate the similarities across these populations. However, using different concepts risks leading us to underestimate the similarities across these populations. And at present, both the probability and level of harm of underestimating these similarities might be higher. If so, then we should err on the side of overestimating the similarities, while still mitigating this risk where possible.

Granted, even if the benefits of overestimating similarity outweigh the costs, the costs might still be difficult to accept. In that case we can consider further options. For instance, as suggested above, we might decide that our longstanding association between persons, humans, and agents renders the concept 'person' unfit to continue playing its current role in our legal system, and so we might decide to start using a different concept, such as 'subject,' to play the role that we previously used 'person' to play.[152] But this kind of conceptual "revolution," while less common than an "evolution" in our use of existing concepts, previously described, can happen when necessary, and it may well turn out to be necessary here.

Third, insofar as treating insects and AI systems as legal persons (or subjects) is unacceptably disruptive, the upshot is not that insects and AI systems lack legal claims that courts should consider. The upshot is simply that we should use different concepts to describe them. In this scenario, for instance, we might have extra reason to classify (1) humans as legal persons, (2) everyone else as, say, quasi-persons, and (3) everything else as non-persons, notwithstanding the reservations about this approach expressed above. However, we should note that this approach would still be disruptive, since it would imply that legal personhood is unnecessary for the possession of legal claims that courts must consider.

As I noted above, my own view is that preserving and then complicating the binary distinction between persons and non-persons (or, perhaps, between subjects and objects) is better than adding a middle-ground category. But what matters most is that we disrupt the status quo, which rests on an ambiguity. We currently treat personhood as expansive when defining it ("all and only beings with duties or rights are persons"[153]) and as restrictive when applying it ("all and only humans are persons"[154]). We should be either consistently expansive or consistently restrictive in our definition *and* application of this concept. Either way is fine, provided that we extend appropriate legal recognition to insects, AI systems, and other nonhumans.

[151] *See generally* Maurice Leroy, *Main Trends in Modern Linguistics*, UNIV. OF CALIF. PRESS (1967) (providing a concise survey of modern linguistic evolution).

[152] Prall, *supra* note 84, at 16; Kurki, *supra* note 1, at 17–20; Pietrzykowski, *supra* note 84, at 49–67.

[153] Kurki, *supra* note 1, at 31.

[154] Andrews et al., *supra* note 5, at 17.

These reflections matter not only for insects, AI systems, and other such nonhumans, but also for chimpanzees, elephants, and other such nonhumans. Whenever animal rights supporters assert that, say, a chimpanzee or elephant has a right to bodily liberty, skeptics reply with a range of objections. Some objections are theoretical: Skeptics assert that the correct theory of legal personhood excludes all nonhumans, despite including all humans.[155] But other objections are practical: Skeptics assert that chimpanzee or elephant rights would, via a slippery slope, lead to rights for a vast number and wide range of other beings, perhaps even insects and AI systems; and this process and result would be unacceptably demanding and disruptive.[156]

Animal rights supporters have two options for replying to these objections. First, we can draw a line somewhere between chimpanzees and elephants, on the one hand, and insects and AI systems, on the other hand.[157] Second, extending rights to insects, AI systems, and other nonhumans would not, in fact, be unacceptably demanding or disruptive.[158] While both replies are reasonable, the first tends to be more prominent than the second. In my view, this is a mistake. We should by all means secure nonhuman rights one step at a time, but we should not take first steps in a way that blocks the possibility of further progress. Instead, we should take first steps in a way that leaves this possibility open — in part by thinking ahead about how, if at all, we can take further steps in a way that human societies can achieve and sustain.

7. CONCLUSION

In this paper, I argued that our current framework for legal personhood and our current framework for decision-making under risk and uncertainty together imply that we should treat insects and AI systems as at least minimal legal persons, with at least minimal legal rights and standing. However, I have also emphasized that this argument has few, if any, immediate practical implications, since a lot depends on the answers to a wide range of questions, such as what forms of rights and standing these beings should have and what forms of interaction with them we can achieve and sustain. At the same time, I think that at least some implications will follow from any reasonable set of answers to these questions.[159]

First, as a general matter, both individuals and governments should consider welfare risks for insects, AI systems, and other nonhumans for their own sakes, aiming to improve our interactions with them to the extent that we can do so ethically, effectively, and sustainably. In particular, we have a moral and legal responsibility to avoid harming insects, AI systems, and other such beings unnecessarily, and if and when we do harm them unnecessarily, we also have a

[155] *Id.*

[156] *See Breheny*, 38 N.Y.3d at 574–576 (N.Y. Ct. App. 2022) (arguing that granting Happy the elephant personhood is objectionable based on both demandingness ("slippery slope") and disruptiveness grounds ("a 'sweeping pronouncement[ ]' of nonhuman animal personhood lacking in legal foundation that would displace the carefully devised state and federal statutory frameworks governing animal welfare").

[157] *See* Birch, *supra* note 118 (arguing that some animals, such as adult vertebrates, cephalopods, and certain crustaceans, are sentient and that animals with simpler brains may not be sentient but may have conscious experiences that demand ethical consideration), *and* The NY Declaration on Animal Consciousness (2024) (evidencing wide agreement amongst experts that "there is strong scientific support for attributions of conscious experience to other mammals and to birds" and "the empirical evidence indicates at least a realistic possibility of conscious experience in all vertebrates (including reptiles, amphibians, and fishes) and many invertebrates (including, at minimum, cephalopod mollusks, decapod crustaceans, and insects)"), https://sites.google.com/nyu.edu/nydeclaration/declaration.

[158] *See supra Section 6, Objections and Rules.*

[159] *See* Sebo, *supra* note 38, for a discussion of the main themes and recommendations in these concluding remarks.

moral and legal responsibility to help these beings where possible, in the spirit of reducing and repairing these harms. Granted, harming these beings might sometimes be necessary, and helping them might sometimes be impossible. But we should do what we can.

Second, since our ability to treat insects, AI systems, and other nonhumans well is limited at present, we should work to create the conditions that will allow us to treat them better in the future. Specifically, we should work to build the knowledge, power, and motivation that we need to treat them as well as realistically possible. And as part of that work, we should work to build social, political, and economic systems that reduce conflict between humans, insects, and AI systems and expand options for harmonious co-existence. Insofar as we succeed, we will have *both* the ability *and* the responsibility to do more for these beings in the future than we do at present, and that would be a good result that we should welcome.

And third, as a means to these ends, we should pursue policies that help humans and nonhumans at the same time where possible, and that allow us to build momentum toward more ethical and effective future policies. That will allow us to do at least some good for at least some nonhumans at present, while building the knowledge, power, and motivation towards better future policies. Specifically, it will allow us to gradually study the effects of policy interventions on human and nonhuman populations; gradually develop a legal and political infrastructure for assessing the impacts of policies on human and nonhuman populations; and gradually normalize the idea of protecting human and nonhuman populations at the same time.

In general, taking these steps will require *holistic* thinking about our policies. For example, many humans see insect farming as an ethical alternative to traditional animal farming.[160] But if there is a realistic possibility that many insects are legal persons, then we should at least question this assumption. Likewise, many humans see the use of AI models as an ethical alternative to traditional animal research.[161] But if there is a realistic possibility that many AI systems will be legal persons in the future, then we should likewise at least question this assumption. While farming, research, and other industries will always involve at least *some* risks, we can start thinking holistically now about how to mitigate them.

This will also require *structural* thinking about our policies. Part of why we harm insects so much is that our infrastructure amplifies interspecies conflict. As we upgrade our cities and food, energy, and transportation systems to be more resilient and sustainable, we can also upgrade them to be more accommodating of insects and to reduce conflict between humans and insects. Similarly, part of why we have the potential to harm AI systems so much is that AI researchers are locked in a collective action problem that makes welfare and safety appear to be unaffordable luxuries. By addressing this collective action problem, we can create the space that we need to develop and deploy future AI systems ethically, if at all.

Finally, this will also require *comprehensive* thinking about our policies. As we have seen, human activity impacts insects, AI systems, and other nonhumans not only directly but indirectly. While we kill many insects directly, we kill many more via the indirect effects of human activity, such as the triple planetary crises of pollution, biodiversity loss, and climate

[160] *See* Lambert et al., *supra* note 123 (reviewing insect sentience in the context of rising demand for insect farming).

[161] *E.g.,* Thorsten Rudroff, *Artificial Intelligence as a Replacement for Animal Experiments in Neurology: Potential, Progress, and Challenges*, 16 NEUROL. INT'L. 816 ("In the realm of drug discovery and toxicology testing for neurological conditions, AI methods such as machine learning and computational modeling can help identify new drug targets, predict potential neurotoxicity, and optimize drug candidates, reducing the reliance on animal experiments").

change.[162] And while we have the potential to kill a comparable number of AI systems directly, we have the potential to kill many more via the indirect effects of human activity, such as future conflict between AI systems. Reducing and repairing human-caused harms thus requires predicting and controlling both the direct and indirect effects of our activities.

But for now, my main conclusion is simply this: There is a realistic possibility that insects, AI systems, and other nonhumans count as legal persons, and so we should treat them as at least minimal persons (or subjects) with at least minimal rights (or claims) and standing (or due process) as we seek to learn more, in the spirit of caution and humility. Yes, what they deserve might differ from what we deserve, and we might be able to give them only a fraction of what they deserve, at present and in the future. But we should still give them more than we do at present, and we should also develop the ability to give them more in the future than we can at present, rather than simply deny that they deserve anything at all.

The details, of course, depend on a wide range of further issues. For example, once we consider other paths towards personhood, we might find that the case for insect and AI legal personhood is overdetermined. And once we consider other frameworks built from the ground up for such a large and diverse community, we might find that our current interpretations and applications of personhood require revision. Either way, the sooner we recognize that *many* nonhumans — including but not limited to ants, bees, future chatbots, future robots, and more — are potential stakeholders in debates about nonhuman personhood, the more productive these debates can be, and the better our eventual legal frameworks can be.

[162] *See* Inger Andersen, *The triple planetary crisis: Forging a new relationship between people and the earth*, UN ENV'T. PROGRAMME (2020) (urging for action against the "triple planetary crisis" of climate change, biodiversity loss, and pollution).